Space Weather Forecast

Issued on Sunday, 28 August 2022 at 00:19 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate class flares Likely with R1-R2; Minor-Moderate radio blackouts) throughout. Chance of Strong flares. G1 Minor Storm possible with coronal mass ejection glance late day 1 or early day 2 (28th or 29th). Chance of Minor Radiation Storm.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: There were several Moderate class flares observed in the past 24 hours. These mostly observed from a moderately sized sunspot region in the southwest which is approaching the limb. This sunspot is large, complex, and has generally grown in the last 24 hours. One of the flares generated a fast CME, which has been assessed as giving a glancing impact late on the 28th or early 29th, although confidence is low.

Solar Wind / Geomagnetic Activity: The solar wind likely showed an ongoing arrival of faster solar winds from a coronal hole which have risen from around 300 km/s to 450 km/s and the associated magnetic field was at weak to moderate levels (8-14nT). The important northwards southwards component of the magnetic field was initially unremarkable, but became occasionally negative (southward) from 27/0900 UTC. Geomagnetic activity was Quiet, becoming Unsettled to Active by 27/1200 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) increased as a result of the Moderate-flaring of the large sunspot in the southwest. This led to an S1 Radiation storm occurring for a time in the second half of the period.

Four-Day Space Weather Forecast Summary

Solar Activity: Further Moderate-class flares are likely with a chance of a Strong flare. This risk will probably decrease later in the period as the main sunspot in the southwest rotates off the disc.

Solar Wind / Geomagnetic Activity: The aforementioned CME could give a glancing arrival late on the 28th or early 29th. Current fast wind enhancement is expected to continue to give Unsettled to Active geomagnetic activity with an increasing chance of G1 Minor Storm geomagnetic activity on day 1 (27th) into day 2 (28th or 29th). This comes from another coronal hole sourced fast wind. This could be coupled with any CME arrival, giving the potential of Active to Minor Storms, with a slight chance of Moderate storms. Thereafter conditions are expected to ease towards background with increasingly Quiet geomagnetic activity.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently just below the S1 level and there remains a chance of further increases above this level, for much of this forecast period, with any notable flares from the large sunspot located in the far southwest of the visible disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	40	60	20	10
Strong	G3	No	5	10	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	60	30	30
Very Active	R3 to R5 X	No	25	20	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	25	25	20	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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